

REMARKS

INTRODUCTION:

Claims 1-18 were rejected under 35 U.S.C. § 102(e) as being anticipated by Miura et al.(USPN 6,163,563).

Claim 19 was objected to, but would be allowable if suitably amended.

Claims 20-32 are allowed.

These rejections are respectfully traversed and reconsideration is requested.

In accordance with the foregoing, claims 1 and 9 have been amended and claim 19 has been cancelled without prejudice or disclaimer.

No new matter is being presented, and approval and entry of the foregoing amendments and new claims are respectfully requested.

Claims 1-18 and 20-32 are pending and under consideration (claims 20-32 have been allowed). Reconsideration is requested.

REJECTION UNDER 35 U.S.C. §102:

In the Office Action at pages 2-3, the Examiner rejected 1-18 were rejected under 35 U.S.C. § 102(e) as being anticipated by Miura et al.(USPN 6,163,563).

This rejection is respectfully traversed and reconsideration is requested.

Claim 1 has been amended to show more clearly that the present invention utilizes a first organic solvent to dissolve a terpolymer, adds lithium salt and a second organic solvent that acts as a gelling agent to provide an electrolyte forming composition, sandwiches the electrolyte forming composition and a separator between the cathode and the anode, and vaporizes the first organic solvent to provide a polymeric gel electrolyte of a lithium battery.

Claim 9 has been amended to include claim 19, which was cancelled without prejudice or disclaimer, and is now deemed to be in form for allowance.

For the purposes of the following discussion, to avoid unnecessary complexity, an exemplary solvent is selected from each of the groups of organic solvents listed for the first organic solvent and the second organic solvent. Thus, the conclusions below are deemed to be generally true for all the organic solvents listed in the specification for the first organic solvent and the second organic solvent.

It is respectfully submitted that it is known to those skilled in the art that solvent mixtures are used when a single solvent does not have all the necessary properties. A value of a dielectric constant serves as an index of an ability of a substance to resist the transmission of an electrostatic force from one charged body to another. The lower the value, the greater the resistance. For example, air has a dielectric constant of 1.0 (a low value), water has a dielectric constant of approximately 81 (a high value), acetone has a dielectric constant of 1.0 at 37°C and ethylene carbonate has a dielectric constant of 89.6 at 40°C. Thus, ethylene carbonate is a very effective conductor. In contrast, acetone is a poor conductor.

However, for the terpolymer, acetone is a better solvent than ethylene carbonate.

The charge distribution on the molecules of a solvent directly affects the capability of the solvent to dissolve compounds. The degree of polarity of a solvent molecule affects the capability of the solvent to dissolve materials that have some degree of polarity. A dipole moment of a molecule is a value obtained by multiplying the distance between the charges on the portions of the molecule times the quantity of the charge on the electrostatic units. The dipole moment of acetone is 2.9 debye. In contrast, the dipole moment of ethylene carbonate is 5.5 debye. The general rule of dissolution in chemistry is "like dissolves like." Hence, since acetone demonstrates less polarity and the terpolymer tends to be non-polar, acetone serves as a more useful solvent than ethylene carbonate.

In the present invention, the inventor utilizes the high degree of dissolving capability of acetone or the like to dissolve the terpolymer, resulting in a terpolymer intermediate solution, i.e., dissolution of the terpolymer changes the tertiary configuration of the terpolymer, as is known to those skilled in the art. Such an intermediate is not taught by Miura et al. (USPN 6,163,563).

Upon mixing the terpolymer intermediate solution with a lithium salt and, for example, ethylene carbonate, the ethylene carbonate acts as a gelling agent. By sandwiching the mixture and a separator in the battery case and applying a vacuum, the low boiling point first organic solvent, such as acetone, is removed, increasing the concentration of the materials therein and increasing the gelling efficiency of the ethylene carbonate, thus providing the lithium battery of the present invention that has a polymeric gel electrolyte.

It is respectfully submitted that, as shown by amended claims 1 and 9, the present invention is not anticipated by Miura et al.(USPN 6,163,563) under 35 U.S.C. §102.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot, and further, it is respectfully submitted that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any additional fees associated with the filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,
STAAS & HALSEY LLP

Date: August 1, 2003

By: Mark J. Henry
Mark J. Henry
Registration No. 36,162

1201 New York Avenue, N.W., Suite 700
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501